Little Calumet and Burns Ditch TMDL for *E.coli* Bacteria, Dissolved Oxygen, Cyanide, and Pesticides

Data Report

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1.0 INTRODUCTION

Section 303(d) of the Clean Water Act requires states, territories, and authorized tribes to list waters for which technology-based limits alone will not meet water quality standards. These lists are submitted to the USEPA on April 1 of each even-numbered year. The waters on these lists are prioritized, with consideration given to the severity of the pollution and the intended uses of the water. The parameters of concern for Little Calumet River and Burns Ditch were *E.coli* bacteria, DO, cyanide, and pesticides based on the 1998 (303)d list. However, as of the latest 303(d) list (2002), pesticides and DO were removed.

As part of the priority ranking system, states are to establish TMDLs that will meet the water quality standard considering seasonal variations, a margin of safety, and future growth. A TMDL is based on the relationship between sources of pollution and in-stream water quality conditions. This creates for a waterbody the allowable loadings without exceeding the water quality standards. The following generic equation describes a TMDL:

$$TMDL = LC = \sum WLA + \sum LA + MOS$$

Where: LC = loading capacity;
WLA = wasteload allocation, or the portion of the TMDL allocated to existing or future point sources;
LA = load allocation, or the portion of the TMDL allocated to existing or future nonpoint sources and natural background; and
MOS = margin of safety, or an accounting of uncertainty about the relationship between pollutant loads and receiving water quality. The margin of safety can be implicit or explicit.

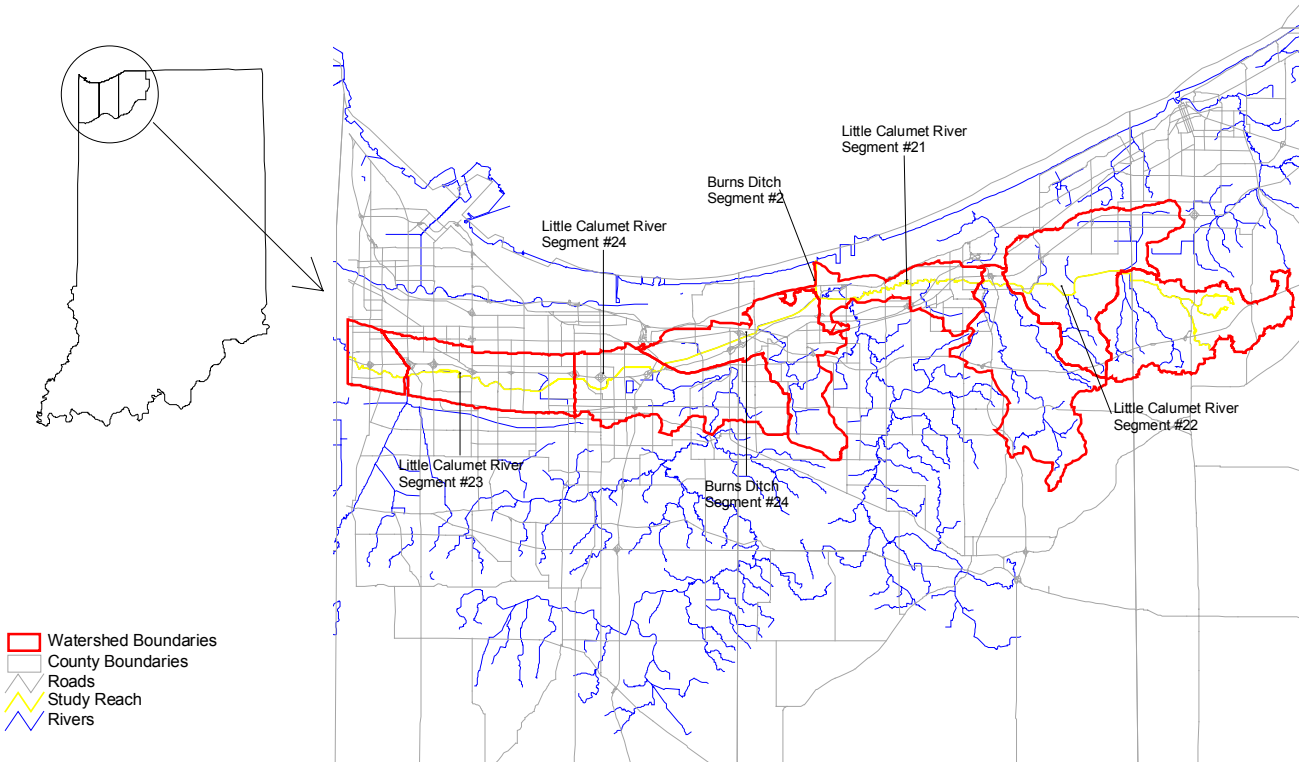
Once approved by the USEPA, the TMDLs are to be incorporated into the state's continuing planning process.

1.1 Problem Statement

Little Calumet River is located in the Little Calumet – Galien Watershed (USGS Cataloging Unit 04040001) and Chicago Watershed (USGS Cataloging Unit 07120003) and Burns Ditch is located entirely in the Little Calumet – Galien Watershed in Northwest Indiana (Figure 1).

The study reach of Little Calumet River can be divided into two portions: the West Branch and the East Branch. The West Branch of the River flows in two directions, east towards Burns Ditch and west towards Illinois. The study reach of the West Branch is from the Illinois state line to the confluence with Burns Ditch in the Town of Lake Station, approximately 18 miles. The East Branch of Little Calumet River flows from LaPorte County towards Burns Ditch, approximately 24 miles. The study reach of Burns Ditch encompasses the entire stream, from Lake Station to Lake Michigan, approximately 8 miles.

Figure 1 Location Map of Study Area



The following 14 digit hydrologic unit areas (HUAs) encompass these study reaches: 04040001060010, 04040001060020, 04040001060030, 04040001060040, 04040001040030, and 04040001040020 in the Little Calumet-Galien Watershed, and 07120003030050 and 07120003030060 in the Chicago Watershed.

The study watershed consists of nearly 134 mi^2 of area in Lake, Porter, and LaPorte Counties. Major cities in the watershed are Gary, Hammond, Portage, and Chesterton. Porter County has had a rapid population growth of 13.9% between 1990 and 2000, while LaPorte and Lake Counties have seen only a slight growth with a 2.8% and 1.9% change, respectively (Census Bureau, 2000).

Major land uses in the watershed consist of 48% agriculture, 19% forested, 18% residential, and 14% urban. The other 1% consists mainly of waterbodies, gravel pits and other sandy areas (USGS LULC Digital File, 1990). The majority of the residential and urban areas are in the western section of the Little Calumet River along the Illinois border while the majority of the farmland is located in the south central portion of the watershed and in the eastern portion of the study area.

From the USDA-NRCS STATSGO (1994) soils information, there are four major soil series in the watershed: Coloma-Spinks-Oshtemo (25%), Rensselaer-Darroch-Witaker (24%), Riddles-Crosier-Oshtemo (21%), and Gilford-Maumee-Sparta (11%). The Gilford-Maumee-Sparta soil series is found along the West Branch of Little Calumet River, while the Coloma-Spinks-Oshtemo soil series is found in the rest of the western portion of the watershed. The Rensselaer-Darroch-Witaker series is mostly found in the southern portion of the watershed and along the East Branch of the Little Calumet River. The Riddles-Crosier-

Oshtemo soil series is found along the southern boundary of the eastern portion of the watershed. The following table lists the properties of these soils.

Table 1
Major Watershed Soil Series

Soil Series	Hydrologic Group	Soil Drainage Class	Hydric Soil (Y/N)
Coloma-Spinks-Oshtemo	A	Excessive	N
Rensselaer-Darroch-Witaker	B/D	Very Poor, Poor	Y
Riddles-Crosier-Oshtemo	B	Well Drained	N
Gilford-Maumee-Sparta	A/D	Very Poor, Poor	Y

Except for the portion of Little Calumet River that flows into Illinois, the water in Little Calumet River and Burns Ditch enters Lake Michigan just Northeast of Ogden Dunes and the Indiana Dunes National Lakeshore. This watershed is the largest in the region that drains to the lake. According to the Inter-Agency Technical Task Force on *E.coli*, officials in the region have had to close the beaches along the lakeshore due to high bacteria levels occasionally (Inter-Agency Technical Task Force, 1996). It is believed that the main reason for the high bacteria levels is due to CSOs and nonpoint source pollution (agriculture, failing septic systems, etc.) in the watershed.

The scope of this project was determined based on the 1998 303(d) list. However, the 2002 303(d) list had some parameters delisted and added some parameters to the study reaches. The following table lists the impairments and stream segments for which the Little Calumet – Burns Ditch TMDL will be developed:

Table 2
Study Reaches and Parameters

Water Body	Segment Number	Location	Impairment
Burns Ditch	2	Confluence of East Branch LCR and Burns Ditch North, in Porter County	*E.coli*
Burns Ditch	24	Burns Ditch west to Deep River, just east of I-65 in Porter and Lake Counties	*E.coli*
Little Calumet	21	Confluence of the West Branch of LCR and Burns Ditch east to an unnamed tributary, just west of Hwy 20 in Porter County	*E.coli*
Little Calumet	22	Unnamed tributary east including headwaters of the stream in Porter and LaPorte Counties	*E.coli*
Little Calumet	23	Black Oak to Illinois, in Lake County	Cyanide
Little Calumet	24	Deep River west to Black Oak, between SR 912 and SR 53	*E.coli* & Cyanide

1.2 Applicable Water Quality Standards

Indiana has set water quality standards to maintain the chemical, physical, and biological integrity of the waters in the state. Both Little Calumet River and Burns Ditch are designated for full-body contact recreation. The East Branch of Little Calumet River is designated as salmonid water that shall be capable of supporting salmonid fisheries. A portion of the study reach of Burns Ditch (from the confluence with the East Branch of Little Calumet River to the mouth) is also designated as a salmonid water. The West Branch of Little Calumet River, along with the rest of Burns Ditch, is designated for warm water communities.

Indiana's water quality standards for state waters within the Great Lakes System (327 IAC 2-1.5-8) establishes criteria for *E.coli* and cyanide. The following criteria are used for the development of the Little Calumet-Burns Ditch TMDL:

- ***E.coli***
  Shall not exceed 125 per 100 milliliters as a geometric mean based on not less than five samples equally spaced over a 30-day period nor exceed 235 per 100 milliliters in any one sample in a 30-day period.

- **Cyanide**
  Criterion continuous concentration (CCC) (four-day average) (µg/l) = 5.2

2.0 TMDL WATER QUALITY DATA INVENTORY

Several sources of information were attained and analyzed for the Little Calumet River and Burns Ditch TMDL study. The data ranges from industrial discharges to fixed station sampling conducted by IDEM. The following sections describe the sources of data, the parameters sampled for, and the sampling dates.

2.1 IDEM Data

The following sections detail the data that was obtained from IDEM. Most of the data was collected by IDEM and is approved for use in the TMDL development. However, the data collected by the Point Source Committee Voluntary Monitoring Network (Section 2.1.5) is currently being reviewed by IDEM to determine if the data is approved for use.

2.1.1 Fixed Station

There are several fixed monitoring stations located on Little Calumet River and Burns Ditch. The following table lists the stations that are within our study reach, along with the parameters of interest that were sampled for and the time period of sampling. Not all parameters were necessarily sampled for during the entire time period.

Table 3
IDEM Fixed Stations

Fixed Station	Stream	Location	Parameters of Concern	Sampling Date
BD 3W	Burns Ditch	Portage Boat Yard Dock, Portage	Cyanide (total) & *E.coli*	07/31/2000 - 04/17/2002
BD 2E	Burns Ditch	SR 249 Bridge (Crisman Road)	Cyanide (total) & *E.coli*	01/26/1990 - 04/17/2002
BD 1	Burns Ditch	US Highway 12, Portage	Cyanide (total) & *E.coli*	04/01/1998 - 04/16/2002
LCR 13	Little Calumet River	Hohman Avenue Bridge, Hammond	Cyanide (total, free, and chlorine amenable) & *E.coli*	01/16/1991 - 01/23/2002

Fixed Station	Stream	Location	Parameters of Concern	Sampling Date
LCR 39	Little Calumet River	SR 149, South of US Highway 12, Porter	Cyanide (total) & *E.coli*	06/25/1990 - 04/17/2002

2.1.2 Water Quality Monitoring Locations

In addition to the fixed monitoring stations, IDEM has been collecting stream samples at additional locations to test for *E.coli*, Cyanide, and/or general water chemistry. The following table lists these stations:

Table 4
IDEM Monitoring Stations

Location Number	Location	Parameters	Sampling Date
LMG060-0002	Wagner Road	*E.coli* & Cyanide	04/199 - 11/1999 and 03/2000 - 11/2000
LMG060-0017	Waverly Road	*E.coli*	06/22/2000 -10/4/2000
LMG060-0014	US 12	*E.coli*	08/01/2000-08/29/2000
LMG060-0012	Midwest Steel Catwalk	*E.coli*	07/31/2000 - 08/29/2000
LMG060-0006	Midwest Steel Catwalk-outlet	*E.coli*	07/31/2000 - 08/29/2000
LMG060-0025	Morgan Ave.	*E.coli*	07/25/2000 - 08/22/2000
LMG060-0016	USGS Gauging Station near Porter on US 20	*E.coli*	08/1/2000 - 08/29/2000
UMC030-0005	Columbia Dr. Bridge, South of Riverside	*E.coli*	07/25/2000 - 08/21/2000
UMC030-0001	Manor Ave. and Hollywood Ave.	Cyanide (Total)	06/13/2000 - 10/2/2000
LMG040-0001	SR 51	Cyanide (Total)	06/13/2000 -10/4/2000
LMG040-0004	SR 53 Bridge, south of Exit 10 I-80	*E.coli*, Cyanide (Total)	07/25/2000-08/21/2000
UMC030-0007	SR 912 southbound, south of I-80-95 Exit 5	*E.coli*	07/25/2000-08/21/2000
LMG060-0007	Portage Public Marina	*E.coli* & Cyanide (Total)	01/24/1990-04/17/2002
LMG060-0013	SR 249 & E Br of Little Calumet	*E.coli*	08/01/2000
LMG060-0009	Salt Creek Landing	*E.coli*	07/24/2000-08/22/2000
LMG060-0019	E Br Little Calumet River & CR 250 E	*E.coli*	08/01/2000-08/29/2000
LMG060-0008	SR 149, S of US Hwy 12	*E.coli* & Cyanide (Total)	06/05/90-12/13/2000
LMG060-0011	Bridge on CR 1300N, W of CR 450 E	*E.coli*	07/24/2000-08/22/2000
LMG060-0020	E Br Little Calumet River & CR 450 E	*E.coli*	08/01/2000-08/29/2000
LMG060-0021	E Br Little Calumet River & CR 600 E	*E.coli*	08/01/2000-08/29/2000
LMG060-0022	E Br Little Calumet River & Otis Road	*E.coli*	08/01/2000-08/29/2000

2.1.3 NPDES Facilities

There are several NPDES facilities that discharge directly into Little Calumet River and/or Burns Ditch. The following table lists these facilities.

Table 5
NPDES Facilitates

NPDES Facility ID	Facility Name	Receiving Water
ING080159	Wolverine Pipeline Company	Little Calumet River via groundwater
IN0059714	Beta Steel Corporation	Burns Harbor West Arm via storm sewer
IN0000175	Bethlehem Steel Corporation	Little Calumet River and Burns Harbor
INU060801	Burns Harbor and Bethlehem Steel	Little Calumet River via Bethlehem Steel
IN0022578	Chesterton Municipal STP	Little Calumet River to Lake Michigan
INS200001	Indiana Pickling and Processing	Burns Harbor West Arm
IN0000337	National Steel, Midwest Division	Burns Ditch to Lake Michigan
IN0024368	Portage Municipal STP	Burns Ditch to Lake Michigan
INU046949	Town of Porter WWTP	Little Calumet River East Branch
IN0043435	Praxair, Burns Harbor Facility	Little Calumet River to Lake Michigan

There are also facilities that do not discharge directly into Little Calumet River or Burns Ditch but rather discharges into tributaries that could have an affect on Little Calumet River and Burns Ditch. Table 6 lists these facilities.

Table 6
Additional NPDES Facilities

NPDES Facility ID	Facility Name	Receiving Water
IN0041891	Nob Hill Subdivision	Deep River via Unnamed Tributary
ING080131	Tranmontaigne Pipeline, Dyer	Little Calumet River via Plum Creek
ING340034	Lakehead Pipeline, Hartsdale	Turkey Creek via Spring Street Ditch
ING340026	Teppco-Griffith Terminal	Turkey Creek via Unnamed Drainage Ditch
IN0043907	Community Utilities of Gary	Turkey Creek to Deep River to Little Calumet River
INU035548	Merrillville C.D. WWTP	Turkey Creek via Lift Station Overflow
ING670032	Nisource Crossroads Pipeline	Peregrine Ditch to Duck Creek to Deep River
ING080156	Coastal Service Station	Lake George via Turkey Creek via Storm Sewer

Another tributary of Little Calumet River is Salt Creek. There are facilities on this Creek that were not listed above. Concurrently with this study, Wittman Hydro Planning Associates is developing a TMDL for Salt Creek. The results of their analyses will be incorporated into the TMDL for Little Calumet River and Burns Ditch

2.1.4 Bypass Facilities

IDEM also provided Earth Tech with sanitary and industrial sewer bypass data from several facilities in northwestern Indiana. The data provided indicated the date of the bypass and, in some instances, the amount of flow bypassed. No water quality data was provided for the discharges. Table 7 details which facilities in the study area had bypasses and the date of occurrences.

Table 7
Northwestern Indiana Bypass Occurrences

Facility ID	Facility Description	Date of Occurrences	Receiving Water
IN0000175	Bethlehem Steel Corporation	08/19/1998	Little Calumet River
IN0000175	Bethlehem Steel Corporation	10/05/1998	Little Calumet River
IN0000175	Bethlehem Steel Corporation	06/02/1999	Little Calumet River
IN0000175	Bethlehem Steel Corporation	06/02/1999	Little Calumet River
IN0000175	Bethlehem Steel Corporation	04/20/2000	Little Calumet River
IN0000175	Bethlehem Steel Corporation	07/03/2002	Little Calumet River
IN0022578	Chesterton Municipal STP	01/24/2000	Little Calumet River
IN0022578	Chesterton Municipal STP	04/11/2001	Little Calumet River
IN0000337	National Steel, Midwest Division	03/27/2000	Burns Ditch
IN0000337	National Steel, Midwest Division	03/27/2000	Burns Ditch
IN0000337	National Steel, Midwest Division	04/09/2000	Burns Ditch
IN0000337	National Steel, Midwest Division	04/10/2000	Burns Ditch
IN0024368	Portage Municipal STP	02/26/1997	Burns Ditch
IN0024368	Portage Municipal STP	06/06/1997	Burns Ditch
IN0024368	Portage Municipal STP	03/09/1998	Burns Ditch
IN0024368	Portage Municipal STP	03/17/1998	Burns Ditch
IN0024368	Portage Municipal STP	03/19/1998	Burns Ditch
IN0024368	Portage Municipal STP	03/20/1998	Burns Ditch
IN0024368	Portage Municipal STP	03/21/1998	Burns Ditch
IN0024368	Portage Municipal STP	05/07/1998	Burns Ditch
IN0024368	Portage Municipal STP	02/17/2001	Burns Ditch
IN0024368	Portage Municipal STP	02/28/2001	Burns Ditch
IN0024368	Portage Municipal STP	04/14/2001	Burns Ditch
IN0043435	Praxair, Burns Harbor Facility	06/28/2000	Little Calumet River

2.1.5 Combined Sewer Overflows

In addition to the above bypass occurrences, data was provided for 1998 that detailed CSO occurrences for the Gary Wastewater Treatment Plant and the Chesterton Wastewater Treatment Plant that discharged into the Little Calumet River. This data did not indicate locations of the occurrences, but rather gave the total flow amount that occurred on a given date.

Additional data was collected by the Point Source Committee of the Interagency Task Force (see Section 2.3 below for a description of this Committee). Tetra Tech created an online database for the members to enter their data into during the summers of 1999 and 2000. CSO activity at Chesterton and Gary was recorded in this database.

Chesterton's Wastewater Treatment Plant was contacted to determine if any other discharges or bypasses occurred beyond what was provided by IDEM and the Task Force. Dick Condon indicated that there might be. He provided Earth Tech with all bypass information from 1993-2002.

Portage Wastewater Treatment Plant was also contacted. Rick Dodd indicated that as of 1997 they have had no CSO activity and as of June 1, 1998 they have not had any bypasses. He did state that they have had some SSO activity. He is going to send Earth Tech the SSO data.

2.2 Gary Sanitary District Data

The Gary Sanitary District is conducting two studies of the Little Calumet River, The Little Calumet River Water Quality Assessment (funded by IDEM) and the Little Calumet Reach Characterization and Evaluation Report. Sample data was collected at seven bridges during two rain events and three dry events. The wet sampling occurred on September 18, 2001 and April 27, 2002. The dry sampling occurred on April 27, 2001, June 25, 2001, and December 11, 2001. In addition to the seven bridges, three additional bridges and five CSO outfalls were sampled for the stream characterization study. The following is a list of the sample site locations:

Water Quality Assessment Study

- Ripley Street Bridge
- Clay Street Bridge
- Martin Luther King Drive Bridge
- Georgia Street Bridge
- Grant Street Bridge
- Clark Street Bridge
- Cline Street Bridge

Stream Characterization Study

- Chase Street Bridge
- Broadway Street Bridge
- Railroad Tracks Bridge
- 27th Avenue and Chase Street CSO
- 15th Avenue and Elkhart Street CSO
- 32nd Avenue and Broadway Street West CSO
- 25th Avenue and Louisiana Street CSO
- 25th Avenue and Wisconsin Street CSO
- 32nd Avenue and Broadway at Alley 1 East CSO

As part of the study funded by IDEM, a Quality Assurance Project Plan (QAPP) was completed and approved for the project. The data from this study was determined acceptable to use in the TMDL development since a QAPP has been approved by IDEM. Greeley and Hansen, LLC, who conducted the studies, indicated that the same procedures were followed with the additional bridge and CSO sampling.

The dry weather samples in this study can be used as background data to the wet weather samples. The wet weather samples occurred when CSO's were actively flowing. By comparing the dry and wet weather samples, a relationship between when the CSO's are discharging and *E.coli* concentrations may be able to be made.

2.3 Interagency Task Force *E.coli* Data

In 1998, 1999, and 2000, the Point Source Committee of the Interagency Task Force on *E.coli* conducted stream and beach sampling at several locations within the northwest area. The purpose of this sampling was to find a relationship between point source discharges and *E.coli* bacteria levels, and then correlate this to Lake Michigan beach closures. The following list indicates the locations of the samples that are within our study reach (some locations were previously listed in Tables 3 and 4):

- East Branch Little Calumet River & CR 450 E (208.5)
- Little Calumet River at CR 1275 N (Site 209)
- Little Calumet River at Calumet Road (Site 210)
- Chesterton Outfall (Site 211)
- Little Calumet River at Waverly Road (Site 212)
- Little Calumet River at Wagner Road (Site 213)
- Bethlehem Steel Outfall (214)
- Little Calumet River at Samuelson Road (Site 215)
- Little Calumet River at Clay Street (Site 216)
- Little Calumet River at Portage's Outfall (Site 220)
- Portage's Outfall (Site 220.1)
- Little Calumet River at South Shore Marina in Portage (Site 221)
- Burns Ditch at Portage Marina (Site 222)
- Burns Ditch at US Hwy 12 at Midwest Steel (Site 223)
- Burns Ditch at Mouth at Midwest Steel (Site 225)
- Burns Ditch at Midwest Steel outfall (Site 224)
- Burns Ditch at Portage Marina (Site 235)

As stated previously, the data collected by the Point Source Committee Voluntary Monitoring Network is currently being reviewed by IDEM to determine if the data is approved for use.

The Committee is also conducting another project, The Non-Point Source Monitoring Project, in the region to conduct weekly samples in headwater tributaries. Interns collected the data for the IDNR and IDEM during the summers of 2000, 2001, and 2002. Since IDEM oversaw this project, this data should be acceptable to use in the TMDL development. The following locations are located within the study reach:

- Coffee Creek at Mander Road, South of Tratebas Road (Porter09)
- Coffee Creek at CR 1050 N and CR 200 E (Porter10)
- Sand Creek at CR 350 E, North of CR 950 N (Porter11)
- Little Calumet River at CR 600 E, South of CR 1350 N (Porter12)
- Carver Ditch at CR 500 E (Porter20)
- Carver Ditch, South of CR 1500 N (Porter21)
- Kemper Ditch at County Line Road, South of CR 300 (Porter22)
- Reynolds Creek, South of CR 1275 (Porter23)
- Kemper Ditch at County Line Road and I-94 (LaPorte21)
- Little Calumet River at Holmesville Road (LaPorte26)
- Little Calumet River at Otis Road (LaPorte27)

- Reynolds Creek at Snyder Road (LaPorte31)

2.4 Indiana Geological Survey *E.coli* Data

The IGS, along with the Biological Research Division of the USGS, and the Department of Geological Sciences of Indiana University conducted a project to develop a method of forecasting outfalls of *E.coli* into Lake Michigan from the Little Calumet Watershed. This project involved the sampling of *E.coli* at a pier where Burns Ditch flows under US Highway 12 in Portage (Lefty's Landing).

The data collected by the IGS has not been approved for use in the TMDL development. Kathy Luther of IDEM is working to get the data approved.

2.5 United States Geological Survey Data

The USGS measures the quantity and quality of surface waters at several streams and rivers in the state of Indiana. There are five gages located within our study reach that measure flow. The following table lists these gages and the availability of data.

Table 8
USGS Streamflow Data

Station ID	Description	Data Range
05536195	Little Calumet River at Munster	1958 - present
04095090	Burns Ditch at Portage	10/1994 - present
04093500	Burns Ditch at Gary	1943 - 1992
40932000	Little Calumet River at Gary	Stage only since 12/1984
40940000	Little Calumet River at Porter	1945 - present

In addition to the gauges that measure flow, the USGS also has collected water quality samples from various locations in the watershed. The following table lists these sampling locations. However, due to the date of collection, it is felt that this data is too old to be used to develop a TMDL for the region. Most of the data is over 20 years old, and land use has changed dramatically in these years.

Table 9
USGS Water Quality Data

Station ID	Description	Parameters	Data Range
05536195	Little Calumet River at Munster	Flow, turbidity, DO, pH, ammonia, phosphate	12/1979 - 08/1986
04093500	Burns Ditch at Gary	pH	04/07/1980
04093200	Little Calumet River at Gary	Flow, turbidity, DO, pH, ammonia, phosphate	12/1979 - 04/1980
04094000	Little Calumet River at Porter	Turbidity, DO, pH, ammonia, nitrate, phosphate, phosphorus	08/1973 - 07/1980
04095000	Little Calumet River near McCool	Flow, turbidity, DO, pH, ammonia, phosphate, phosphorus, suspended sediment	04/1978 - 09/1980
413358087211901	Little Calumet River @ Grant St in Gary	DO, pH	04/07/1980
413641087084701	Little Calumet River above	DO, pH	12/1979 - 07/1980

Station ID	Description	Parameters	Data Range
	confluence with Salt Creek and Burns Ditch		
413648087084501	North Tributary Little Calumet River above confluence near Burns Harbor	DO, pH	12/1979 - 07/1980
413706087100501	Burns Ditch @ Hwy 12 Near Odgen Dunes	DO, pH, ammonia, phosphate, phosphorus	10/1978 - 07/1980
413745087052200	Nike Sewage Effluent Chesterton	DO, pH, ammonia, nitrate, phosphorus	08/1973 - 11/1976
413538087131301	Little Calumet River @ Hwy 20 Near East Gary	DO, pH, ammonia, phosphate, phosphorus	10/1978 - 07/1980

2.6 Septic System Information

With 48% of the watershed being agricultural land there is the likelihood that these areas are served by septic systems. In addition, there still could be residential/urban areas that are served by septic systems. The Health Departments in Lake, LaPorte, and Porter counties do not have much information that is useful to TMDL development. Porter County has indicated to Kathy Luther of IDEM that they do not have information for the TMDL development. LaPorte County has also indicated that they do not keep information about the septic systems that could be useful for a TMDL. However, they do know of areas that have general septic system problems. A meeting with LaPorte County to look at maps is to be held on December 11, 2002.

The Lake County Health Department indicated that there are not any septic systems located North of US Hwy 6 (37th Avenue) or if there are they are within the Gary or Hammond Districts. The Hammond Sanitary department indicated that there are two areas within the watershed that have homes on septic, however there are less than six houses in these areas. They did state that the only way that they know if a home is on septic systems is when the homeowner calls in complaints and then workers discover that the home is on septic not on City sewer. This creates the possibility that there are more homes in Hammond that are on septic systems, however they have not called in complaints to the Hammond Sanitary District.

2.7 Meteorological Data

IDEM provided daily rainfall data for the area for 1998. Additionally, the city of Chesterton reported rainfall data for the area from 1993-2002.

There are five weather stations in the region that record rainfall for the area. The data for these stations is available from the NCDC or from Purdue University. The data from Purdue University has been collected. If it is determined that the data from the NCDC is needed IDEM's assistance may be needed to collect data, since there is a cost for this data.

- Valparaiso's airport July 1968-present
- Crown Point 1991-present
- Michigan City June 1970-present
- Gary 1907-present
- Valparaiso Waterworks 1890-present

2.8 GIS Data

2.8.1 IGS Data

Along with the *E.coli* sampling at Lefty's Landing in Portage, GIS data sets were compiled for the region by the IGS. The following table lists the data sets we have downloaded from the IGS website.

Table 10
IGS GIS Data

Description	Source
CSO outfall locations	Unknown
Drainage divide	US Census Bureau, TIGER/Line® files, 1995, source scale 1:100,000
2-ft elevations	USGS, Digital line graph data, 1986, source scale 1:100,000
Salmonid streams	IDNR, Div. of Fish and Wildlife, 1992
STATSGO soils	USDA, SCS, 1994, source scale 1:250,000
Bacterial monitoring points	USEPA, 1970-1994. Obtained from IDNR
E.coli monitoring points	*E.Coli* Task Force
Fish tissue sampling sites	IDEM
Forest density	USDA, 1993. Obtained from IDNR
Highway	US Census Bureau, TIGER/Line® files, 1995, source scale 1:100,000
Water invertebrates sampling sites	IDEM
Landfills	USGS, 1987. Obtained from IDNR
Land use	USGS, Land use and land cover digital data from 1:250,000 and 1:100,000 Scale Maps, 1990, source scale 1:250,000
NPDES facilities	IDEM
Leaking underground storage tanks	IDEM
Permit compliance system (PCS)	IDEM
Power plants	HAZUS, 1997, FEMA and National Institute of Building Sciences
Railroads	US Census Bureau, TIGER/Line® files, 1995, source scale 1:100,000
RCRA facilities	Dataset created in September 1997. Obtained from IDEM
Refineries	HAZUS, 1997, FEMA and National Institute of Building Sciences
Roads	US Census Bureau, TIGER/Line® files, 1995, source scale 1:100,000
Sediment sampling sites	IDEM
Spills	IDEM
Superfund sites	USEPA, 1993. Obtained from IDNR
Surface water intakes	IDEM, 1996 Water-use data
Solid waste facilities	IDEM
Toxic release inventory	IDEM
Urban areas	US Census Bureau, TIGER/Line® files, 1995, source scale 1:100,000
Underground storage tanks	IDEM
Water treatment facilities	HAZUS, 1997, FEMA and National Institute of Building Sciences

Description	Source
Water quality monitoring sites	USEPA, 1970-1994. Obtained from IDNR
Nature preserves	IDNR, Digitized from 1:24,000 quadrangle maps
NWI wetlands	U.S. Fish and Wildlife Service, Div. of Nature Conservation, Source Scale 1:24,000
NPDES pipeline	IDEM
Fill material	USGS

2.8.2 Purdue University Data

Purdue University's Department of Agricultural and Biological Engineering maintains the Center for Advanced Applications in GIS (CAAGIS). From this website the following GIS data sets were obtained.

Table 11
CAAGIS GIS Data

Description	Source
FEMA flood boundaries	FEMA, 1979-1981 FIRMs. Available only for Lake County
Aerial photography	USGS, 1998
Watershed boundary (14-digit)	USGS, 1946-1991, source scale 1:24,000
7.5' quadrangle maps	USGS, various dates

2.8.3 USEPA-BASINS Data

The USEPA developed the BASINS system to meet the needs of the USEPA and their counterparts in states and pollution control agencies. This program integrates GIS, national watershed and meteorological data and environmental assessment and modeling tools into one package.

The following data sets were downloaded for the Little Calumet-Galien and Chicago Watersheds from the USEPA's BASINS data download website.

Table 12
BASINS GIS Data

Description	Source
Land use	USGS, 1980, source scale 1:250,000
Streams and rivers (RF1)	USGS, 1982, source scale 1:250,000
Streams and rivers (NHD)	USGS, 1999, source scale 1:100,000
Roads	Federal Highway Administration, Office of Environment and Planning, 1994.
City boundaries	Census, TIGER/Line® files, 1990, source scale 1:24,000
Elevation	USGS, 1993, source scale 1:250,000
Water quality monitoring stations	USEPA, 1970-1997
Water quality observation stations	USEPA, 1980-1995
National sediment inventory stations	USEPA, 1980-1993
USGS gage locations	USEPA, 1992
Bacteria stations	USEPA, 1970-1994, source scale 1:24,000 – 1:100,000
Permit compliance systems	USEPA, 1990-1999
Industrial facilities discharge sites	USEPA, 1978-1994
Toxic release inventory	USEPA, 1987-1995
Watershed Boundary (8-digit)	USGS, 1994 source scale 1:250,000
County boundaries	USGS, 1983, source scale 1:2,000,000

Description	Source
State boundary	USGS, 1994, source scale 1:2,000,000

3.0 DATA STILL NEEDED

Based on the data request letter submitted to IDEM on July 26, 2002, we feel we have collected all available data for the study reaches. If, during the data analysis, it is determined additional data is needed, it will be requested.

4.0 CORRELATION OF DATA

The stream sampling data will be used to determine where water quality violations are occurring at within each reach segment. This can then be correlated back to sources by looking at NPDES permits, land use information, and septic information. Streamflow and precipitation will be used to determine if violations are occurring during dry or wet weather events.

5.0 REFERENCES AND CONTACTS

Protocol for Developing Pathogen TMDLs (EPA 841-R-00-002)
(USEPA, January, 2001)

State and County QuickFacts
available at http://quickfacts.census.gov/qfd/states/18000.html
(United States Census Bureau, 2000)

Scoping Document for the Inter-Agency Technical Task Force on E.coli for the Indiana Shoreline on Lake Michigan
(Inter-Agency Technical Task Force on *E.coli*, November, 1996)

Indiana Administrative Code
http://www.ai.org/legislative/iac/title327.html

BASINS Metadata
http://www.epa.gov/waterscience/basins/metadata.htm

USGS GIS Data Metadata
http://water.usgs.gov/GIS/

USDA-NRCS STATSGO Soils Metadata
http://www.ftw.nrcs.usda.gov/stat_data.html

USGS Indiana
317-290-3333
Don Arvin-flow data
Jeff Martin-water quality data

Lake County NRCS
Bill Moran
219-663-0588 ext. 3
Information about agricultural land

Porter County NRCS
Chuck Walker
219-663-0588 ext. 3
Information about agricultural land

Gary Health Department
Inspection Department
219-881-1393
Little Calumet River sampling

Greeley and Hansen, LLC
Waldo Margheim
574-246-8780
Gary Sanitary District reports

Indiana Geological Survey
Greg Olyphant
812-855-1351
E.coli sample data

IDEM/NRCS
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General agricultural questions about region

National Park Service
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